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ABSTRACT

Students entering the University of North Carolina at Chapel Hill as freshmen in 1967-72 were followed for approximately six years after their initial enrollment to determine the number who received their Bachelor's degrees from the institution. For all six freshmen classes combined, 49.9 percent received their degrees within four years, 64.9 percent graduated within five years, and 67 percent graduated within six years. Women were more likely to graduate and to take somewhat less time to graduate than men. Black students had lower graduation rates than white students, but the rates for blacks have been rising. Students who scored higher on the Scholastic Aptitude Test were more likely to graduate and to graduate earlier than students with lower scores. Students with higher predicted grade point averages tended to take less time to graduate, but they were less likely to graduate than students with lower predicted grades. Students who earned higher grades tended to take less time to graduate. Data on graduation rates from other institutions and the results of national surveys are included for comparison.
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Persistence to Graduation Patterns Among Freshmen Entering The University of North Carolina at Chapel Hill, 1967-72

An analysis of variation in graduation rates considering race, sex, SAT scores, predicted grade point averages, and final grade point averages.

By

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March 1978

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This paper was presented at a Drive-In Conference of the North Carolina Association for Institutional Research in Chapel Hill, N.C., March 31, 1978.

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Figures 1,4,5,7, and 8 have been revised to include 1973 data and are included at the end as pages 28-32.

Abstract

Students entering The University of North Carolina at Chapel Hill as freshmen in 1967-72 have been followed for approximately six years after their initial enrollment to determine the number who received their bachelor's degrees from this institution. For all six freshmen classes combined, 49.9% received their degrees within four years of their initial enrollment;* 64.8% graduated within five years; and, 67.0% graduated within six years. A large majority of those who did graduate received their degrees at the May commencement four years after their initial enrollment. Additional analyses found that women are more likely to graduate and to take somewhat less time to graduate than men. Black students have lower graduation rates than white students, but the rates for blacks have been rising. Students who scored higher on the Scholastic Aptitude Test are more likely to graduate and to graduate earlier than students with lower SAT scores. Students with higher predicted grade point averages tend to take less time to graduate, but, surprisingly, they are less likely to graduate than students with lower predicted grades. Considering only those students who did graduate, students earning higher grades while enrolled here tend to take less time to graduate. Data on graduation rates from other institutions and national surveys are included and show that rates for UNC-CH compare favorably to those of similar institutions.

*Preliminary data for the class of 1973, when combined with these six classes, gives a four year graduation rate of 50.2%.

Persistence to Graduation Patterns Among Freshmen Entering The University of North Carolina at Chapel Hill, 1967-72

Open system theory (Katz and Kahn, 1966) is a useful framework for analyzing organizations of all types, and in simplified form it provides a basic model for reviewing persistence to graduation patterns among students entering post-secondary educational institutions. Succinctly characterized as input/output (I/O), this model represents the major operation of colleges and universities: freshmen are admitted and seniors graduate. With full realization that much detail (in regards to both open system theory and the diverse operations of most educational institutions) is sacrificed by adopting this simplified I/O model, use of the model nevertheless forms a viable setting for examining graduation rates of students.

Open System Theory

I/O Model Applied to Graduation Rates

Graduation rates, particularly for students who entered the same institution as freshmen, can be an indication of several important dimensions of

college life at specific institutions, among groups of similar institutions, or across a wide range of institutions. Indirectly at least, graduation rates may be interpreted as general, though inexact, measures of student satisfaction with the institution, of an institution's effectiveness in helping freshmen "become" graduates, and of an institution's efficiency on the "production" line. Peripherally, graduation rates also serve as comparative measures of institutional quality or prestige in that the most selective private colleges and universities tend to have the highest rates of students persisting to graduation (Newman, 1971).

In thinking of graduation rates and what they may or may not mean, one should retain a broad perspective, on one hand, in realizing that persistence to graduation is only a small part of what colleges and universities do, while, on the other hand, one should limit one's focus to what graduation rate numbers actually say; that is, one should not overgeneralize from such figures. In short, graduation rates do reflect reality at educational institutions but they must not become the only measure of reality for any given institution.

Before presenting figures on persistence to graduation rates for freshmen entering The University of North Carolina at Chapel Hill (UNC-CH), the following comments on the data should be mentioned.

1) Students in programs requiring more than four years to complete (pharmacy, for example) were excluded from the 1967 data but were included in all other years.

2) Students enrolled in the two-year Dental Hygiene Certificate Program in the 1970, 1971, and 1972 data were excluded from the analyses where possible; footnotes are provided as necessary.

3) The data pertain only to freshmen entering UNC-CH for the first time

during fall semesters or the summer session immediately preceding each fall semester. Hence, graduation rates refer to bachelor's degrees earned by established cohorts of entering freshmen over time.

4) Uneven cut-off points for collecting data on the various classes make it difficult to estimate the number of students who eventually get their degree from this institution. As figures are presented on the following pages, the time period which they represent is indicated. An attempt is being made to obtain graduation rates after ten years for each class.

5) Cohorts are referred to by the year in which the freshmen entered The University; i.e., the class of 1967 indicates the group who entered as freshmen in 1967.

The Study

Data on graduation rates have been collected by the Office of Records and Registration, UNC-CH, for all freshmen classes entering The University beginning in 1967. Each cohort is established at the conclusion of the registration period for fall semester, and the cohort remains intact with date of graduation being recorded as each individual member of the cohort graduates. Students who leave The University but return to earn their degree remain a part of their original cohort, but data are not available to differentiate between students who graduate after a period of continuous enrollment and those who dropped out for a time and then returned to get their degree. Where possible, figures are included to show numbers of students in cohorts who are still enrolled and working for their degree at the time when data collection on the cohort is discontinued. Some of these students have or will get their degrees from this institution, but they are not included in the data.

The remainder of this paper consists of three parts. First, the findings are presented by reviewing nine figures included in the text. The highlights and possible interpretations of the information contained in the figures are outlined in the text. Second, comparable data from other studies are presented so that comparison across institutions can be made. Third and finally, some concluding comments on the findings of the study are presented.

Findings on Persistence to Graduation Rates

Persistence to graduation rates for the six cohorts of freshmen entering UNC-CH, 1967-72, are presented in Figure 1. The rates are reasonably stable across the six cohorts with an increase in the percent graduating after five and six years for the 1971 and 1972 classes. One could speculate that this increase may be dependent, in part, upon the less "radical" atmosphere which has prevailed on college campuses following the activism of the late sixties and early seventies. Because some of the programs at UNC-CH require more than four years to complete and because it is not unusual for students to "stop-out" for a semester or two during the course of their work on a degree, this paper will use graduation rates after five years as the common basis for study or comparison.

Figure 2 presents the distribution of students within and across cohorts who graduated at each graduation ceremony since June, 1969. It is not surprising that most of the graduates in each cohort graduate in May of the fourth year following their entrance as freshmen; however, it is somewhat interesting to realize that less than 50% of each cohort actually graduate at this traditional time. Figure 3 shows a similar distribution of graduation rates for all six classes but uses number of months between initial enroll-

Figure 1

Graduation Rates for Freshmen Classes
Entering UNC-CH, 1967-72

Classes Entering	After Four Years # Graduated	%	After Five Years # Graduated	%
1967	1281	50.1	1644	64.3
1968	1071	50.6	1348	63.7
1969	1248	52.1	1502	62.7
1970	1351	46.6	1778	61.7
1971	1512	48.9	2016	65.2
1972	1479	51.9	2023	70.9
1973[3]	1656	51.5	Not Available	
1967-73[3]	9598	50.2	10311[4]	64.8[4]

Classes Entering	After Six Years # Graduated	%	Still Enrolled After Six Years #	%
1967[1]	1688	66.0	Not Available	
1968	1383	65.4	64	3.0
1969	1549	64.7	48	2.0
1970	1856	64.0	68	2.3
1971	2131	68.9	87	2.8
1972[2]	2059	72.2	93	3.3
1967-72	10666	67.0	-	-

[1] As of December, 1972 graduation (5-2/3 years).

[2] As of August, 1977 graduation (5-1/3 years).

[3] Preliminary data on the class of 1973 have been received but are only included here.

[4] Figures for the 1967-72 classes only.

NUMBER AND PERCENTAGE OF PERSONS ENTERING UNIV-CAN, 1967-1972, CLASSIFIED BY ENTRY CLASS AND DATE

Entering Freshman Classes

Entry Class	1967 #	1967 %	1968 #	1968 %	1969 #	1969 %	1970 #	1970 %	1971 #	1971 %	1972 #	1972 %
June, 1969	1	-										
June, 1970	21	0.9	2	0.1								
Aug., 1970	19	0.7	0									
Dec., 1970	71	2.8	0									
May, 1971	1,167	45.7	19	0.9								
Aug., 1971	143	5.6	25	1.2	1	-						
Dec., 1971	93	3.6	74	3.5	9	0.3						
May, 1972	127	5.0	951	45.0	35	1.5	18	0.6				
Aug., 1972	35	1.4	112	5.3	37	1.5	2	0.1				
Dec., 1972	9	0.4	78	3.7	51	2.5	9					
May, 1973			87	4.1	1,009	45.4	26	0.9	23	0.8		
Aug., 1973			19	0.9	127	5.3	25	0.9	1	-		
Dec., 1973			9	0.4	31	1.5	70	2.4	2	0.1		
May, 1974			7	0.3	94	4.0	1,210	41.7	42	1.4	19	0.7
Aug., 1974			19	0.9	19	0.7	112	3.9	42	1.4	0	
Dec., 1974			16	0.8	18	0.8	108	3.8	145	5.4	0	
May, 1975					13	0.5	166	5.9	1,295	41.9	47	1.5
Aug., 1975					0	0.3	40	1.4	159	5.3	32	1.1
Dec., 1975							18	0.6	134	4.4	99	3.5
May, 1976							20	0.7	209	6.8	1,287	45.1
Aug., 1976									55	1.8	147	5.2
Dec., 1976									35	1.1	183	6.4
May, 1977									23	0.8	214	7.5
Aug., 1977											38	1.3
Total	1,688	66.04	1,617	67.00	1,537	65.04	1,616	64.00	2,131	68.90	2,859	72.14
Total in Class	2,334		2,115		2,364		2,999		3,091		2,852	

	# Freshmen Entered	# Freshmen Graduated	% Graduated
Total 1967-1972	15,910	10,709	67.30

Data Source: Office of Records & Registration

Prepared by: Office of Institutional Research, 11/8/77.

ment and graduation as the basis of analysis which allows for easier and more direct comparison across cohorts.

Figure 3 clearly shows that the modal time period between entrance and graduation is 45 months which represents the traditional four year attendance pattern as mentioned above. Considering only those students in each class who did graduate, 65.35% received their degree at UNC-CH after this 45 month period. It is interesting to note that the percentage of each class which graduated after 45 months decreased from 69.14% for the 1967 class to 62.51% for the 1972 class. Since the total graduation rate for these classes remained fairly steady (and even rose for the 1971 and 1972 classes), it must be that more students in successive classes graduated earlier or later than the traditional four year, 45 month period. Examination of Figure 3 shows that both are true although fluctuations exist across the six classes. In the 1967 class, 6.75% of those who graduated did so in less than 45 months as compared to 9.32% of the 1972 class who graduated "early". Students taking longer than 45 months to graduate comprised 24.11% of those graduating from the 1967 class; such students made up 28.17% of all graduates from the 1972 entering class. Even realizing that the data are slightly confounded by the inclusion of two-year Dental Hygiene Certificate students and students enrolled in programs requiring more than four years to complete, the information from Figures 2 and 3 suggests that two phenomena, increasingly in evidence at many colleges and universities throughout the country, may be present on this campus, also. Those students graduating somewhat ahead of schedule may be indicative of recent trends toward early graduation through advanced placement, accelerated programs, or the desire to cut down on the expenses of four years of

Number of Months to Graduate for Freshmen Entering UNC-CH, 1967-72

# Months	1967		1968		1969		1970		1971		1972		TOTAL		Cumulative Total	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
21	1	0.04	2	0.09	0	0.0	18[1]	0.6	25[1]	0.8	19[1]	0.7	65	0.4	65	0.4
24	0	0.0	0	0.0	1	0.04	2	0.07	1	0.03	0	0.0	4	0.0	69	0.4
28	0	0.0	0	0.0	3	0.1	0	0.0	2	0.06	0	0.0	5	0.03	74	0.5
33	23	0.9	19	0.9	35	1.5	26	0.9	42[2]	1.4	42[3]	1.5	187	1.2	261	1.6
36	19	0.7	25	1.2	37	1.5	25	0.9	42	1.4	32	1.1	180	1.1	441	2.8
40	71	2.8	74	3.5	84	3.5	70	2.4	105	3.4	99	3.5	503	3.2	944	5.9
45	1167	45.7	951	45.0	1088	45.4	1210	41.7	1295	41.9	1287	45.1	6998	44.0	7942	49.9
48	143	5.6	112	5.3	127	5.3	172	5.9	159	5.1	147	5.2	860	5.4	8802	55.3
52	93	3.6	78	3.7	31	1.3	109	3.8	136	4.4	183	6.4	630	4.0	9432	59.3
57	127	5.0	87	4.1	96	4.0	146	5.0	209	6.8	214	7.5	879	5.5	10311	64.8
60	35	1.4	19	0.9	16	0.7	40	1.4	55	1.8	36	1.3	201	1.3	10512	66.1
64	9	0.4	9	0.4	18	0.8	18	0.6	35	1.1	-	-	89	0.6	10601	66.6
69	-	-	7	0.3	13	0.5	20	0.7	25	0.8	-	-	65	0.4	10666	67.0
72	-	-	18	0.9	8	0.3	-	-	-	-	-	-	26	0.2	10692	67.2
76	-	-	16	0.8	-	-	-	-	-	-	-	-	16	0.1	10708	67.3
Total Graduates	1688	66.0	1417	65.0	1557	65.0	1856	64.0	2131	68.9	2059	72.2	10708	67.3	10708	67.3
# in Class	2556		2115		2394		2900		3093		2852		15910		15910	

[1] All students admitted as Dental Hygiene Certificate Candidates.

[2] Four of these students were Dental Hygiene Certificate Graduates.

[3] One of these students was a Dental Hygiene Certificate Graduate.

college. Students taking longer than four years to graduate may be evidence of the "stop-out" phenomenon in which students drop-out temporarily but return to finish their degrees. Given a rising graduation rate, however, it does not seem that these phenomena, if they are present on this campus, are having any adverse effect upon our students and their pursuit of a bachelor's degree.

Despite a general optimism engendered by a rising rate of persistence to graduation and the seeming fact that more "late" graduates are not resulting in a lower overall graduation rate, Figure 3 presents dismal evidence of students' failure to finish their degree if they postpone their graduation much beyond the traditional four or five year period. The Cumulative Total column (Figure 3) shows that 49.9% of all entering students in the six classes graduated after four years (45 months), which represents 74.2% of all students who graduated during the period for which data were collected. After five years (57 months), 64.8% of all students had graduated but this figure is 96.3% of those who eventually graduated. Thus after five years, only 7.1% of those students who have not graduated will eventually get their degree at UNC-CH. In terms of probabilities, which are somewhat easier to deal with than straight percentages, the cumulative figures for the six freshmen classes entering UNC-CH over the years 1967-72 tell us that one out of every two freshmen entering The University will graduate in four years, that two out of three will graduate eventually, but that fewer than one in ten of those students who have not graduated within five years after entry will ever earn their degree here. These figures, of course, do not reflect those entering freshmen who may transfer to another institution and graduate there.

Figure 4 compares persistence to graduation rates for the same six classes between males and females. As one might expect, women are more likely to graduate than men. It is somewhat interesting to note that the graduation rate for men only exceeds the women's rate, even when comparing between and across years, for men in the 1972 class as compared to women in the 1970 class. Clearly women graduate at higher rates than men in a very stable fashion.

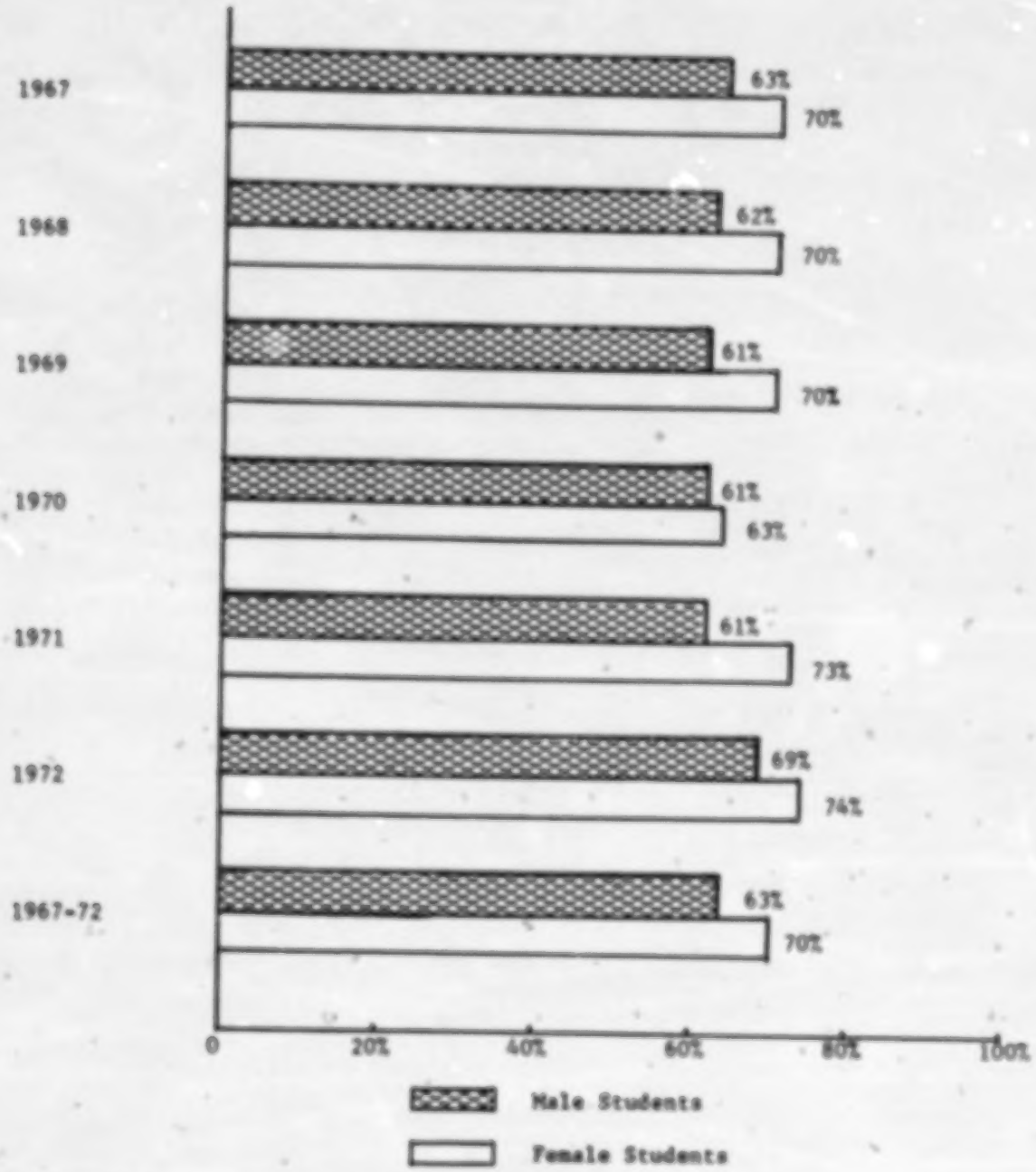
Figures 5 and 6 compare graduation rates by race. While black students have lower graduation rates than white students, it is noteworthy that the rate for blacks has shown such improvement over the years (the 1967 class is an exception because it was before The University made a concerted effort to attract black students). As we shall see in more detail when comparable studies from other institutions are examined, our graduation rate for black students compares favorably to the rate reported by the one other study which differentiates by race; our graduation rate for blacks even exceeds rates reported for non-minority students on many campuses. Please note that Figures 5 and 6 do not represent graduation rates after the same period of time for the six classes; footnotes to Figure 6 specify the periods covered by the graduation rates listed for each cohort. Figure 7, however, does show rates after five years.

Data collection procedures employed for the 1967-70 cohorts preclude a breakdown of persistence to graduation rates by race and sex, but Figure 7 shows this breakdown for the 1971 and 1972 classes after five years. The stable, hierarchical ranking (from low to high) in graduation rates is black males, black females, white males and white females.

Figure 4

GRADUATION RATES OF STUDENTS ENTERING UNC-CH AS FRESHMEN, BY SEX, 1967-1972, AFTER FIVE YEARS

11

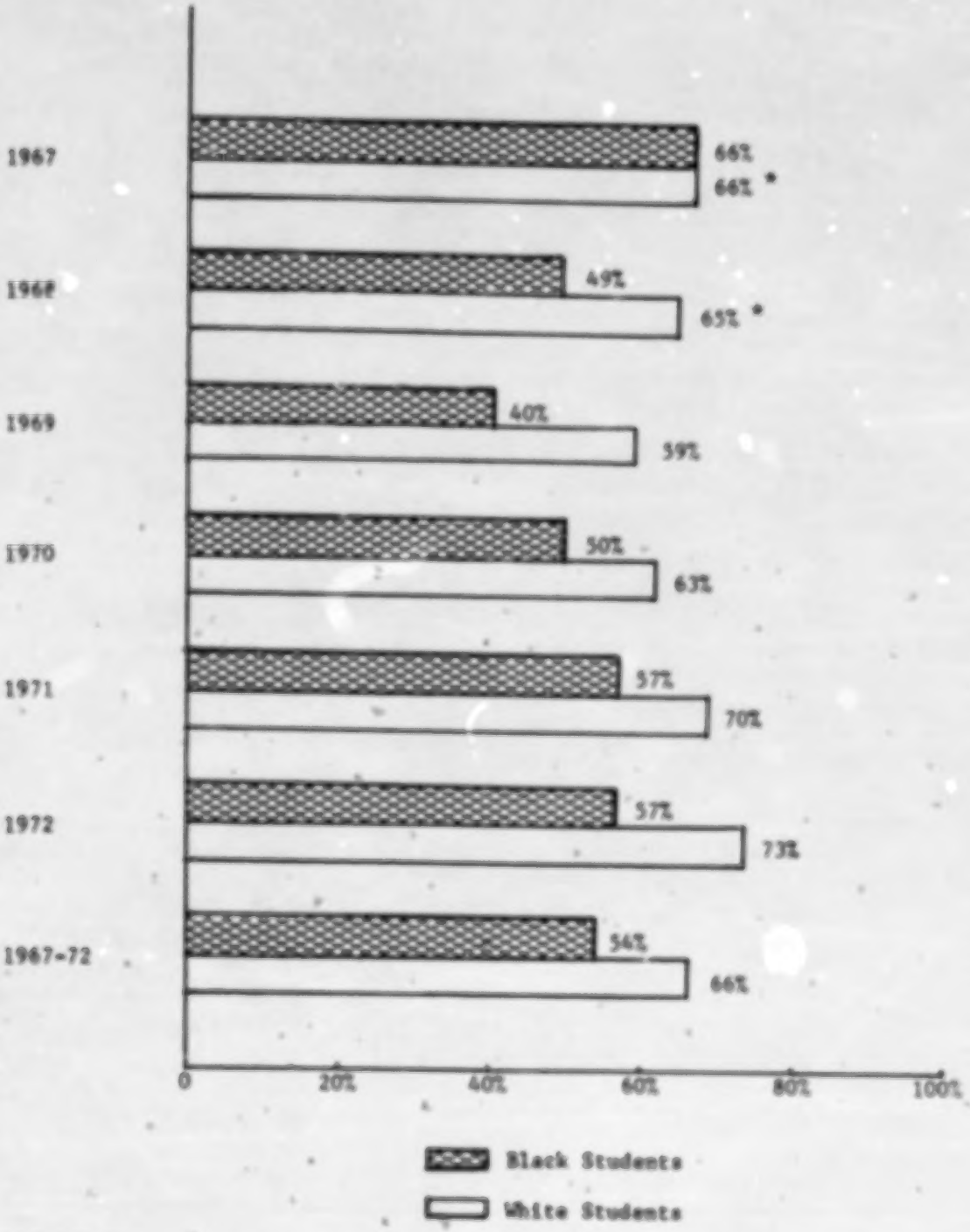


Note: For the freshman classes, 1967-1972, the total graduation rate after five years is 65%.

Data Source: Records & Registration. Prepared by: Office of Institutional Research, 11/8/77.

GRADUATION RATES OF STUDENTS ENTERING UNC-CH AS FRESHMEN, BY RACE, 1967-1972

Figure 5



* Figures for white students in 1967 and 1968 include minorities other than blacks.

Data Source: Records & Registration. Prepared by: Office of Institutional Research, 11/8/77.

Figure 6

Comparison of Graduation Rates Among Black and White Students Who Entered UNC-CH as Freshmen, 1967-72

Class	Black Students			White Students		
	Male	Female	Total	Male	Female	Total
1967[1]						
# Entered	25	4	29	2015	512	2527[2]
# & % Grads	16 64%	3 75%	19 66%	1306 65%	363 71%	1669 66%
1968[1]						
# Entered	30	7	37	1722	356	2078[2]
# & % Grads	12 40%	6 86%	18 49%	1107 64%	251 71%	1358 65%
1969[1]						
# Entered	44	16	60	1840	484	2324
# & % Grads	15 34%	9 56%	24 40%	1051 57%	327 68%	1378 59%
1970[3]						
# Entered	76	51	127	1981	784	2765
# & % Grads	34 45%	29 57%	63 50%	1245 63%	505 64%	1750 63%
1971[4]						
# Entered	113	98	211	1955	916	2871
# & % Grads	65 58%	56 57%	121 57%	1290 66%	712 78%	2002 70%
1972[5]						
# Entered	104	107	211	1625	987	2612
# & % Grads	54 52%	66 62%	120 57%	1162 72%	757 77%	1919 73%
1967-72						
# Entered	392	283	675	11138	4039	15177
# & % Grads	196 50%	169 60%	365 54%	7161 64%	2915 72%	10076 66%

[1] As of December, 1973 graduation.

[2] Figures for white students in 1967 and 1968 include minorities other than blacks.

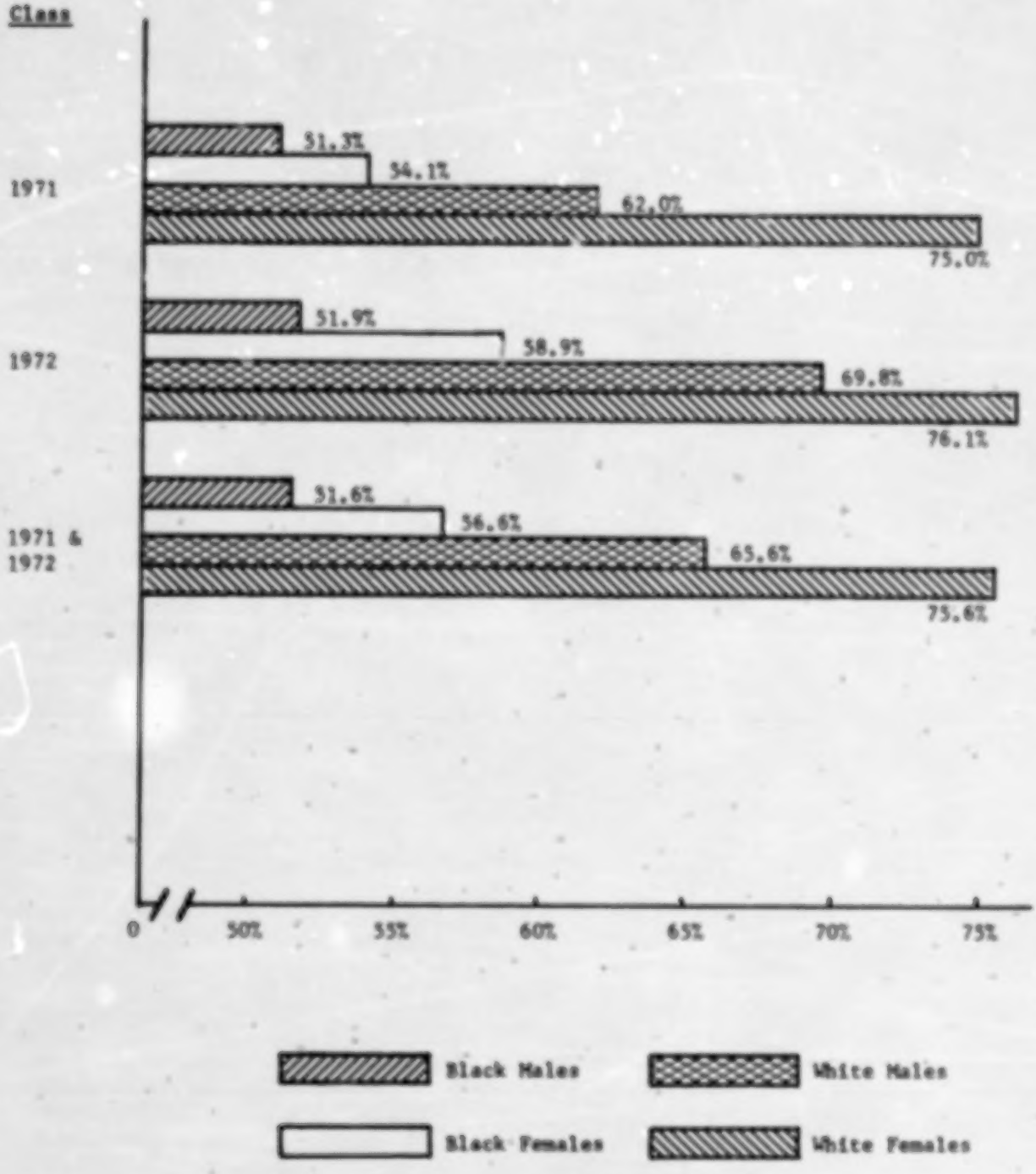
[3] As of August, 1975 graduation.

[4] As of May, 1977 graduation.

[5] As of August, 1977 graduation.

Figure 7

GRADUATION RATES AFTER FIVE YEARS FOR FRESHMEN ENTERING UNC-CH, 1971 AND 1972, BY RACE AND SEX



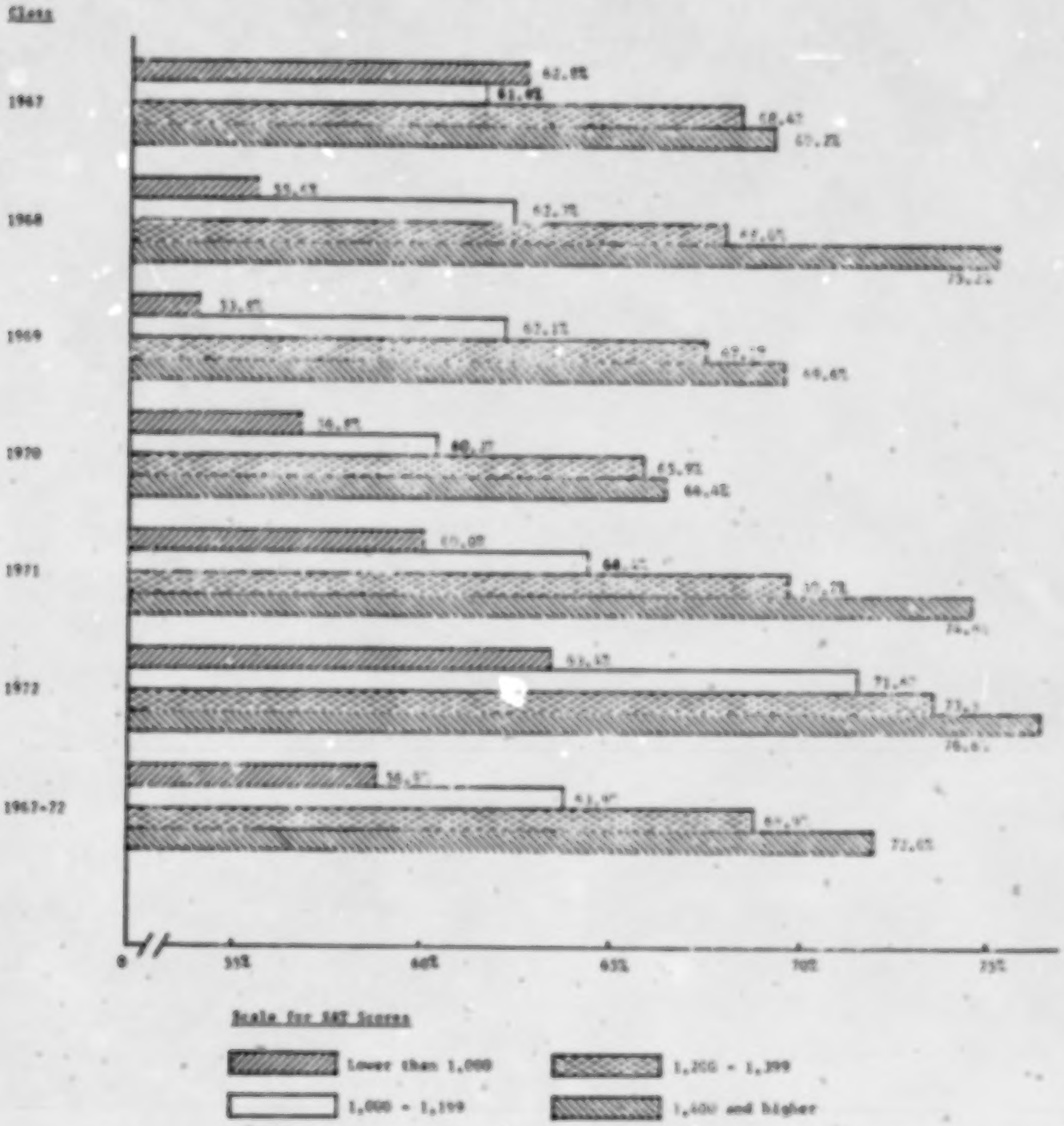
Data Source: Records & Registration. Prepared by: Office of Institutional Research, 1/11/78

Figure 8 presents data on persistence to graduation rates based on Scholastic Aptitude Test (SAT) scores of entering freshmen. With the single exception that the 1967 class shows a higher graduation rate for the sub-group with SAT scores less than 1,000 than for the sub-group with scores between 1,000 and 1,199, this figure strongly supports the predictive validity of SAT scores in regard to success in college. Aside from predictive validity, Figure 8 also suggests that The University has a high rate of retention of its better students (at least better as measured by SAT scores). Unfortunately, though, Figure 8 supports the opposite contention, as well, in that we could interpret the data to suggest that The University is less successful in retaining those entering freshmen who are less qualified. This could mean that UNC-CH does not provide sufficient assistance to less qualified students after admitting them and that improved services in this area might result in a higher graduation rate for students less qualified at time of entrance. To summarize information from Figure 8, it is not a surprise to see that students with higher SAT scores have higher graduation rates; however, one might prefer to see less difference in persistence to graduation rates among the sub-groups shown in the graph as more equal rates could indicate successful efforts on the part of The University to help students with lower scores achieve success (graduation) in a manner more nearly like that of better qualified (higher scoring) students.

The final set of data, Figure 9, presents results of analyses of the relationships between time before graduation (number of months between entry and graduation) and sex, SAT scores, predicted grade point average (PGA), and cumulative grade point average at graduation (GPA). The Pearson

Figure 8

GRADUATION RATES AFTER FIVE YEARS FOR FRESHMEN ENTERING UNC-CH, 1967-1972, BY SAT SCORES



Data Source: Records & Registration.

Prepared by: Office of Institutional Research, 1/11/78

product-moment correlation coefficient (Spence, et al., 1968:120) was used as the basis for analyzing the relationships.

$$r = \frac{\frac{\Sigma xy}{N} - \bar{x}\bar{y}}{\sigma_x \sigma_y}$$

r = Pearson product-moment correlation coefficient
$\bar{x}$ = mean of x variable
$\bar{y}$ = mean of y variable
σ = standard deviation of sub-scripted variable

Before examining Figure 9, it should be stressed that the relationships are between time needed for graduation and the corresponding variable (sex, SAT scores, etc.), and the correlations shown do not reflect the relationships between the variables and graduates/non-graduates (this is presented later). Only graduates were included and the analysis is designed to explore the relationships between sex, SAT scores, etc. and the time elapsed between entry and graduation.

Figure 5 shows that women tend to take less time to graduate than men.

SAT scores are negatively correlated with time needed to graduate so that freshmen with higher SAT scores take less time to graduate than students with lower SAT scores. Figure 9 also indicates that mean SAT scores for entering freshmen who eventually graduated declined, irregularly, from 1,160 for the 1967 class to 1,146 for the 1972 class.

A negative relationship also exists between predicted grade point average (PGA) and time needed before graduation; one is not surprised that students predicted to do well tend to take less time to graduate. Mean PGA for these students increased from 2.432 for the 1967 class to 2.563 for the

Figure 9

Relationships Between Time Period Before Graduation and Sex, SAT Scores, Predicted Grade Point Average, and Final Grade Point Average for Freshmen Classes Entering UNC-CH, 1967-72

	1967	1968	1969	1970[1]	1971	1972[1]
SEX						
Correlation Coefficient	0.18	0.06	0.18	0.07	0.11[2]	0.13
Significance Level	.01	.05	.01	.05	.01	.01
SAT SCORES						
Mean	1,160	1,166	1,156	1,138	1,132[2]	1,146
Standard Deviation	143	152	145	150	154	144
Correlation Coefficient	-0.16	-0.11	-0.16	-0.15	-0.10	-0.08
Significance Level	.01	.01	.01	.01	.01	.01
PGA						
Mean	2.432	2.507	2.491	2.450	2.486[2]	2.563
Standard Deviation	0.443	0.477	0.464	0.467	0.467	0.414
Correlation Coefficient	-0.18	-0.18	-0.19	-0.14	-0.14	-0.11
Significance Level	.01	.01	.01	.01	.01	.01
GPA						
Mean	2.743	2.784	2.860	2.847	2.885[1]	2.959
Standard Deviation	0.477	0.498	0.503	0.496	0.496	0.493
Correlation Coefficient	-0.31	-0.29	-0.27	-0.25	-0.25	-0.21
Significance Level	.01	.01	.01	.01	.01	.01

[1] Dental Hygiene Certificate students excluded.

[2] Of the 28 Dental Hygiene Certificate students entering in 1971, 24 were excluded here.

1972 class although the increase was not uniform across classes.

In looking at cumulative grade point average (CPA), one again finds a negative correlation with time needed before graduation. As with PCA and SAT's, it makes sense that students with higher grades tend to take less time to graduate. Also, it is not surprising that CPA shows the highest, absolute correlation with time before graduation of the four variables included in Figure 9. Particularly is this unsurprising when one recalls that SAT scores and PCA are designed as predictors of success primarily during the student's first year in college and that sex, by itself, is not a factor which influences a student's admission to this institution or opportunity to pursue an education here. Figure 9 also shows an increasing mean CPA for graduates in these classes, 2.743 in 1967 to 2.959 in 1972, which may (or may not) reflect some measure of grade inflation on this campus. Further study would be required before one could determine with a reasonable degree of certainty whether or not the rise in mean CPA was a result of grade inflation or of increased academic achievement by our graduates.

One additional comment in regards to SAT scores, PCA, and CPA and their relationship with time needed to graduate is that the size of the correlations between the variables tended to decrease slightly from 1967 to 1972. While this trend may not be a particularly noteworthy or significant feature of Figure 9, it may be evidence, nevertheless, of an increasing willingness for the better students to deviate from the traditional routine of going to college for four years without interruption. Before such a notion can be confirmed, however, additional study in the area needs to be done.

The final area of analysis performed on the data examined the relation-

ships between sex, SAT scores, and PGA and whether or not students actually graduated. All students who had not graduated at the conclusion of data collection for each cohort were classified as non-graduates even though they may have been enrolled and working towards their degree; all six classes, 1967-72, were combined for this analysis.

For the relationship between sex and graduation, the analysis found a correlation of 0.06 which is significant at the 0.05 level. Women are more likely to graduate than males; more specifically, women who entered this institution as freshmen are more likely to graduate from this institution than are men who entered this institution as freshmen.

The correlation between SAT scores and graduation was -0.09 (significant at the 0.01 level); students entering with higher SAT scores are more likely to graduate than students with lower SAT scores.

In looking at the relationship between PGA (predicted grade point average) and graduation, however, the analysis turned up a curious finding: students with lower PGA's seem to be more likely to graduate than students with higher PGA's (correlation of 0.12, significant at 0.01 level). When one recalls that analyses previously presented show that students with higher PGA's tend to take less time to graduate than students with lower PGA's and that SAT scores, which are an integral part of the equation used to calculate PGA, also are related to both time before graduation and actual graduation in a positive fashion, this finding becomes even more curious. While it is true that the relationship is statistically significant, it may be that the relationship is socially meaningless and may be, in fact, an artifact of the analysis. PGA is used by admissions offices as an indicator of a student's chance of success at an institution, but it is specifically developed to predict the chance of a student

to succeed during the freshman year only; hence, correlational analysis of the relationship between FGA and graduation is, to some extent, a misapplication of the proper use of FGA. In short, the slightly negative relationship between FGA and graduation should be viewed with caution. The finding is statistically valid, but a great deal of detailed research is necessary before much significance can be attributed to it.

Comparable Findings from Other Studies

A number of studies from other institutions and educational research groups on persistence to graduation rates are available in the literature. A brief review of several of these studies follows, and the final part of this section will compare findings from these studies with the findings from UNC-CH.

An Office of Education study of freshmen entering several hundred colleges and universities in 1950 (Iffert, 1957:18) found that 39.0% of the freshmen entering universities had graduated from the same university four years later. An additional 13.1% of these students were still enrolled and working toward a degree.

On a more limited scale, Eckland (1964) followed up 1,332 male freshmen who had entered a midwestern state university in fall, 1952. He found that 28.9% had graduated from the same university in four years, that 13.1% had graduated after more than four years of continuous enrollment at the same university, and that 11.4% had graduated after dropping out and returning to the same institution. After ten years, then, his study showed a total graduation rate of 53.0% (p. 44).

A 1971, ACE study of freshmen beginning college in 1961 (N = 705,512)

and 1966 (N = 1,390,524) found somewhat higher graduation rates but the study was not limited to students who graduated from the same institution (El-Khawas and Bisconti, 1974:60). For the 1961 cohort the study found that 52.8% had received bachelor's degrees from some institution after four years (47.1% for men, 60.4% for women) and that 76.8% had received degrees after ten years (79.0% men, 73.7% women). For the 1966 cohort which is slightly skewed because it included students who initially enrolled in two-year colleges as well as four-year colleges, the study found a graduation rate of 45.2% after four years (41.4% men, 50.5% women) and 56.9% after five years (55.0% men, 59.4% women).

Sherer (1974:554) reports that 50% of the freshmen entering the University of Iowa, Iowa State University, and the University of Northern Iowa in 1965 eventually received degrees from the same institution and estimates that about 25% had earned their degrees in four years.

Another ACE study (Astin, 1972) followed freshmen entering college in fall, 1966, and found that 46.7% graduated from the same institution after four years. For highly selective universities, the comparable figure was 58.8% with an additional 11.1% still enrolled. In looking at racial differences in graduation rates, this study found that blacks showed a rate of 42.7% (with 14.7% still enrolled) as compared to a rate of 47.0% (11.6% still enrolled) for students of all other races.

The State University of New York followed its freshmen classes entering in 1969 and 1970 and found that, for both classes, 54% graduated from the same institution after 4½ years with 8% still enrolled (Annas and Iverson, 1976).

Two, rather non-specific reports of graduation rates show that 30% of the entering freshmen at the University of Texas graduate in four years and that

somewhat fewer than 50% graduate in five years (Pearlstine, 1969), and, for the California State College System, that 13% of entering freshmen graduate in four years with a range across institutions of 8-17% (Five Years Later, 1970).

The Newman Report (1971:2) presents some national figures for students graduating from the same institution at which they had originally enrolled. The fifteen most selective, private universities report graduate rates of 80-85% after four years and 90-95% after ten years. Large state universities show a range of 35-45% after four years and 60-70% after ten years. State colleges report 15-25% after four years and 35-50% after ten years (this final figure includes students getting their degree at any institution).

This collection of studies of students persisting to graduation shows wide variation in graduation rates. The variation appears to parallel differences in selectivity of institutions as well as type of institution, but it also seems that other factors may enter in (such as geographic locale of institution or type of student served by the institution) which makes simple comparative statements across institutions very difficult. Nevertheless, it is possible to compare these findings with those for the six freshmen classes from UNC-CH as long as one realizes that inconsistencies in data collection and reporting preclude definitive conclusions.

Figures for overall graduation rates seem somewhat favorable to the performance of UNC-CH. Graduation rates at this institution are not as high as those reported for private, highly selective universities, but they are higher than those for comparable public universities. For example, Astin's (1972) report of a 46.7% graduation rate after four years for all types of colleges and universities is lower than the UNC-CH average rate for the six freshmen classes of 49.9% after four years; yet, for highly selective uni-

versities Astin reports a 58.8% rate which is higher than that of UNC-CH. Newman (1971) presents a range of 35-45% after four years for large state universities (compared to 49.9% for UNC-CH) but a range of 80-85% for the most selective, private universities in the country. Obviously the results of comparison depend upon the institutions being compared, but it is certainly realistic to state that this institution shows solid evidence of graduation rates which are as high as, if not higher than, graduation rates for students at other, similar institutions.

Although only one other study was found which reports graduation rates by race (Astin, 1972), the findings of that study suggest that black students at UNC-CH do about the same in persisting to graduation as do black students at most colleges and universities. Astin's graduation rate for blacks was 42.1% after four years while the rate for blacks at UNC-CH was 41.2%. This latter figure for UNC-CH represents only the 1971 and 1972 cohorts as four year rates were not readily available for the earlier classes; also this figure, 41.2%, does not match the data in Figures 5-7 because they represent rates after different time periods.

Concluding Comments

Returning briefly to the input/output model (I/O) with which this study began, I/O is a concise, meaningful representation of one of the major processes engaged in by institutions of post-secondary education. Regardless of what goes on within institutions while students are enrolled, it is of vital importance that a reasonably constant flow of freshmen (input) come into the institution and that a similar flow of seniors graduate (output) although the graduation part of the process may be less important in the short-

term future of an institution. I/O does not represent the quality of an institution in any direct fashion, it does not reflect upon what students may or may not learn during their enrollment, and it may, in fact, raise more questions about the educational process at an institution than it answers; yet, I/O, as reflected by persistence to graduation rates, is a useful framework for beginning to understand what happens to students who enter college.

Graduation rates for any particular institution should not be interpreted without reference to the overall goals and functions of the institution. A small, private, liberal arts college with a largely residential enrollment will not view its graduation rate in the same terms as might a large multicampus university in an urban center. To the extent that this is true, institutional differences alone should not be accepted as a valid rationale for the institution with a very low graduation rate, but differences among institutions do suggest that similar graduation rates may mean different things to different institutions.

Graduation rates, as measures of the educational process, reflect both student and institutional variability as well as an inextricable combination of the two. The matching process in which students choose institutions while institutions admit students is a highly visible part of the articulation process between high school and college (Dill, 1977). Similarly, although in a much less overt sense, does this matching process continue thoughout a student's educational career as both the student and the institution "select" among continuing enrollment alternatives and, ultimately, graduation. To the extent that graduation rates can be construed as indicative of thoughtful decisions by students to continue in the same institution and of institutions to retain students, then graduation rates are measures, however, imprecise,

of the "goodness of fit" between students and institutions. If, on the other hand, the matching process is more a function of chance or the demonstration of minimal qualifications for admission, then graduation rates are better thought of as indicators of minimum compatability; that is, students leave institutions and institutions drop students only as a last resort and not because rational thought suggests better alternatives. In all likelihood, graduation rates reflect, and the matching process is, a combination of thoughtful decisions and last resort actions. Such a combination of factors does not negate the importance or usefulness of data on graduation rates for an institution; rather, it simply makes it more difficult to decipher the meaning of an institution's graduation rate.

The data presented here on persistence to graduation rates for students at The University of North Carolina at Chapel Hill appear to reflect a "good fit" between students and the institution. When one also considers information gathered in surveys of students who have graduated from or dropped out of this institution, the general picture is one of wide-spread satisfaction with The University. We are not without our critics, and some of them are quite vociferous, but it does seem that our students really would "rather be in Chapel Hill".

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Figure 1 (revised)

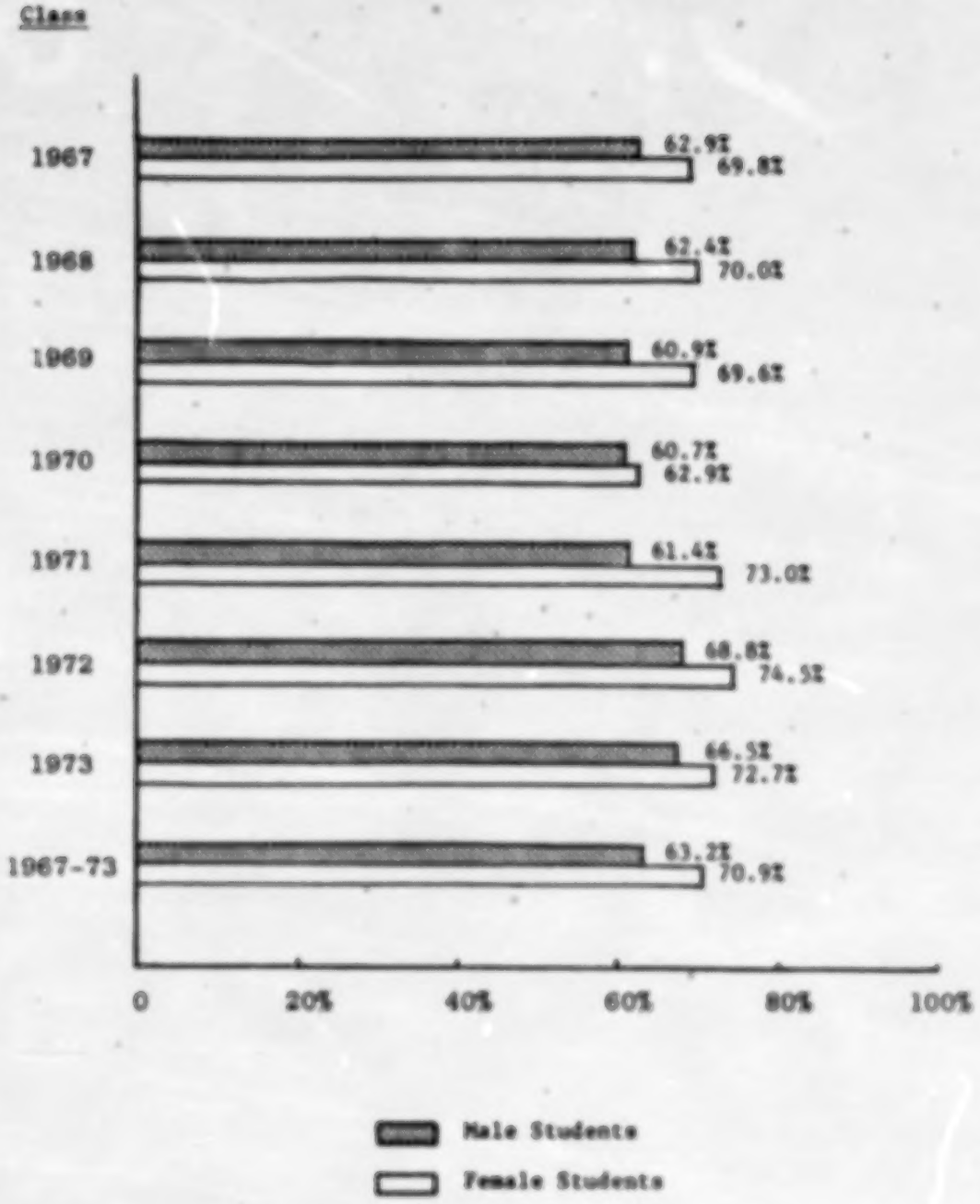
Graduation Rates for Freshmen Classes
Entering UNC-CH, 1967-73

Classes Entering	After Four Years # Graduated	%	After Five Years # Graduated	%
1967	1281	50.1	1644	64.3
1968	1071	50.6	1348	63.7
1969	1248	52.1	1502	62.7
1970	1351	46.6	1778	61.7
1971	1512	48.9	2016	65.2
1972	1479	51.9	2024	71.0
1973	1656	51.5	2223	69.2
1967-73	9598	50.2	12,535	65.5

Classes Entering	After Six Years # Graduated	%	After Ten Years # Graduated	%
1967[1]	1688	66.0	Not available	
1968	1383	65.4	1566	74.0
1969	1549	64.7	-	
1970	1856	64.0	-	
1971	2131	68.9	-	
1972	2098	73.6	-	
1967-72	10,705	67.3	-	

[1]As of December, 1972 graduation (5 2/3 years)

Fig. 4 (revised) GRADUATION RATES OF STUDENTS ENTERING UNC-CH AS FRESHMEN, BY SEX, 1967-73, AFTER FIVE YEARS

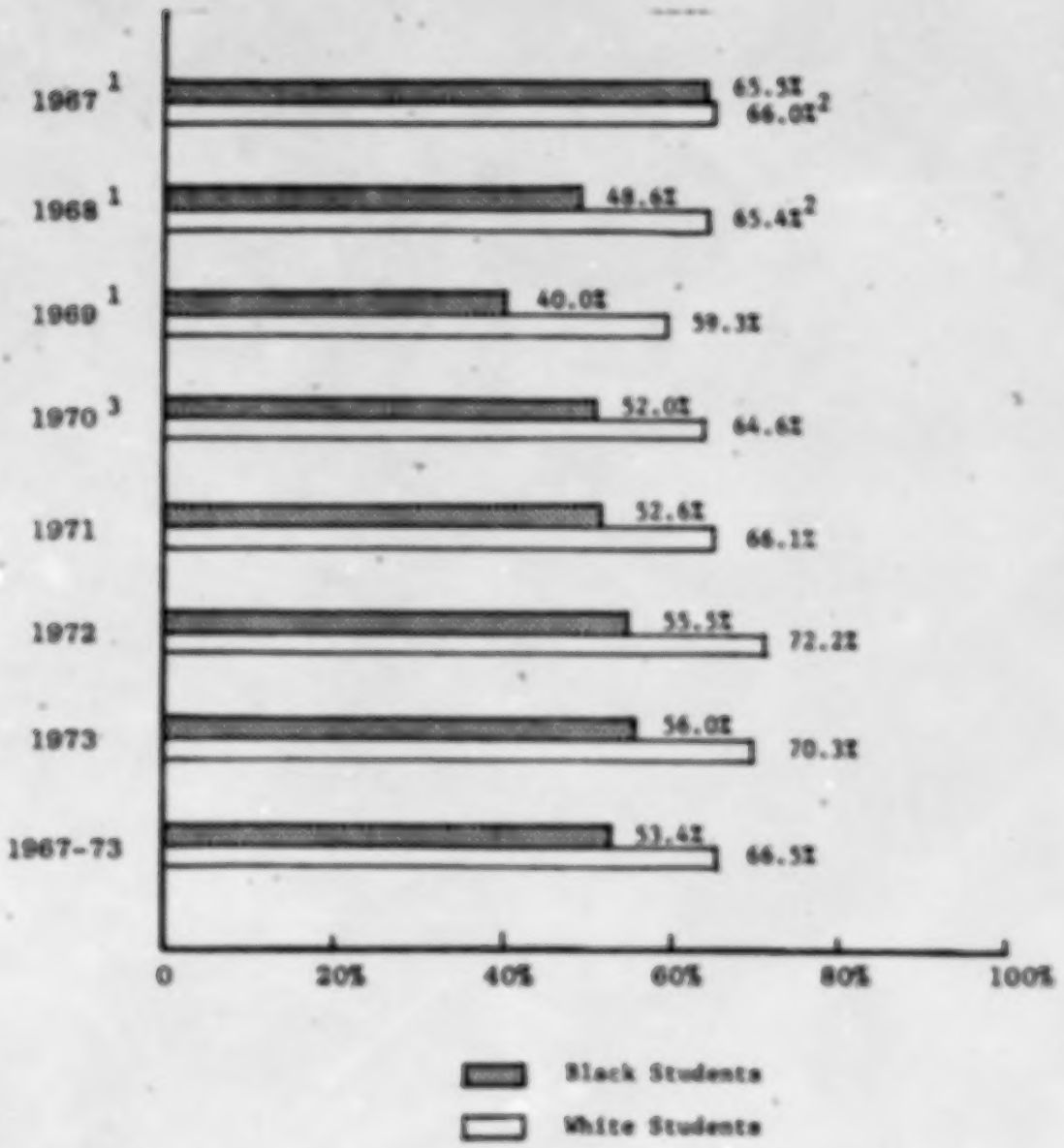


Note: For the freshman classes, 1967-73, the total graduation rate after five years is 65.5%.

Data Source: Records & Registration.
Prepared by: Office of Institutional Research, 9/22/78.

Figure 5 (revised)

GRADUATION RATES OF STUDENTS ENTERING UNC-CH AS FRESHMEN, BY RACE, 1967-1973, AFTER FIVE YEARS



[1] Not five years after entering; figures as of December 1973 graduation.

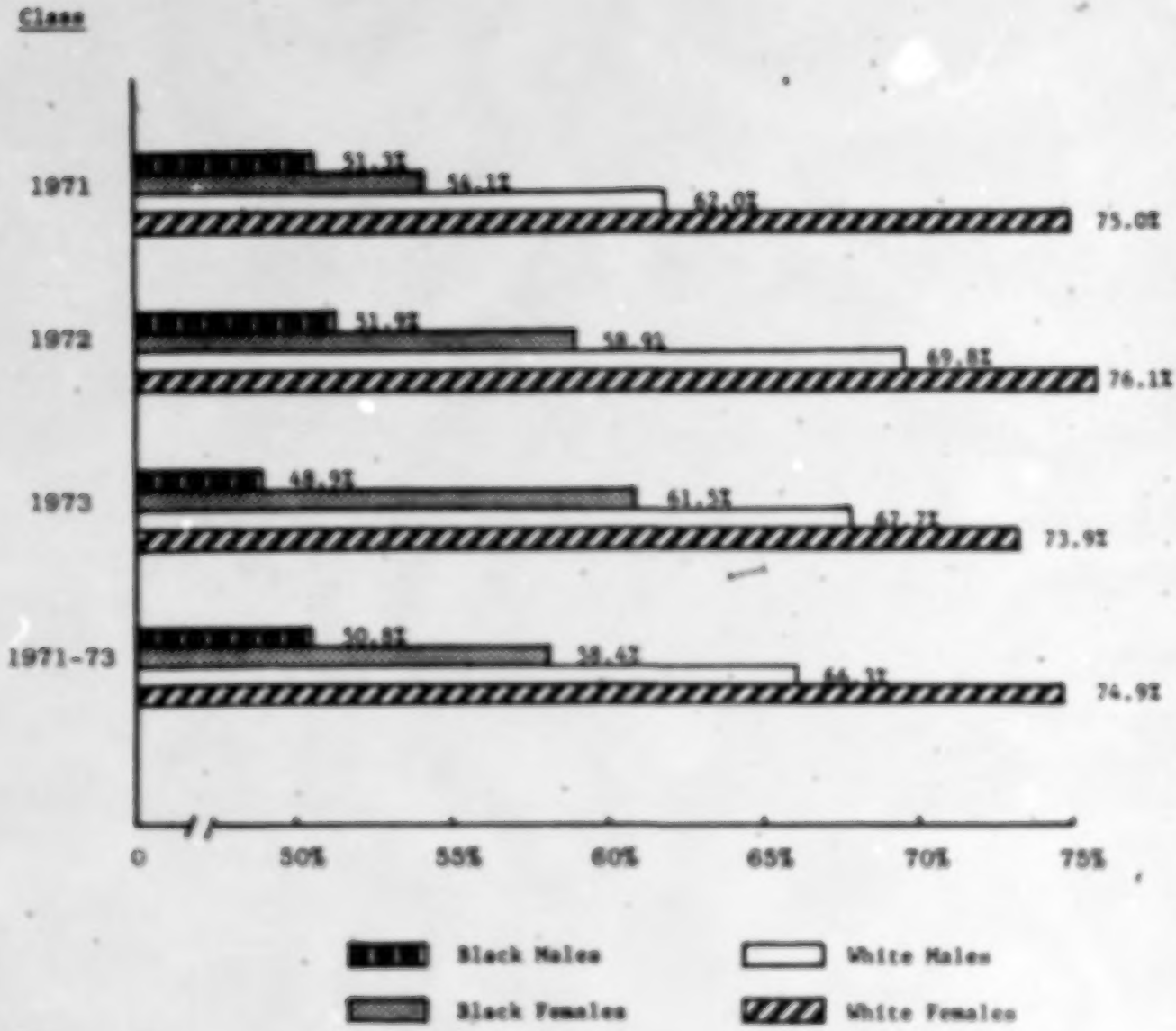
[2] Figures for white students in 1967 and 1968 include minorities other than black.

[3] Not five years; as of May 1976 graduation.

Data Source: Records & Registration.
Prepared by: Office of Institutional Research, 9/22/78.

Figure 7 (revised)

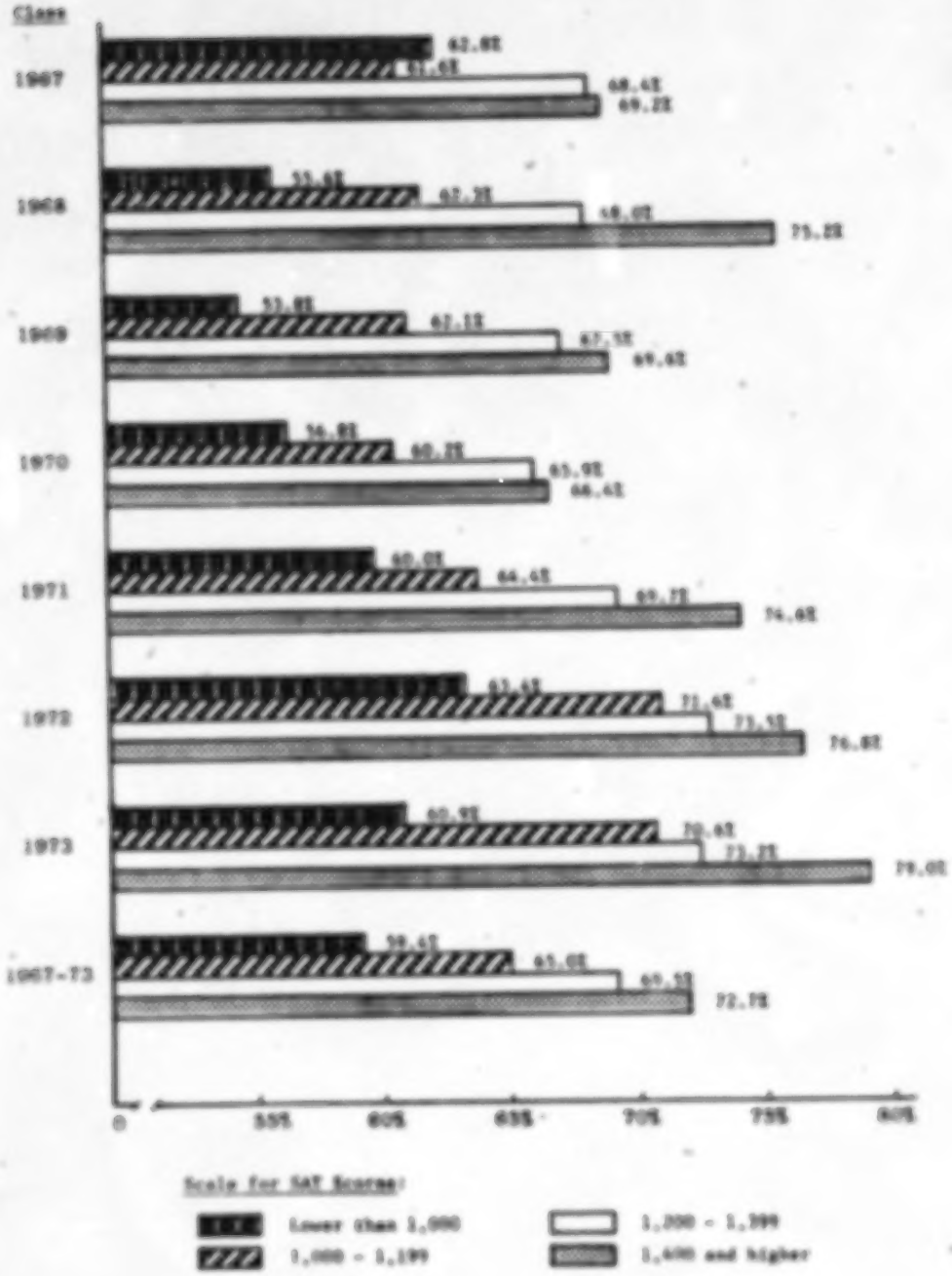
GRADUATION RATES AFTER FIVE YEARS FOR FRESHMEN ENTERING UNC-CH, 1971-73, BY RACE AND SEX



Data Source: Records & Registration
Prepared by: Office of Institutional Research, 9/22/78.

Figure 8 (revised)

GRADUATION RATES AFTER FIVE YEARS FOR FRESHMEN ENTERING UMC-CH, 1967-1973, BY SAT SCORES



Data Source: Records & Registration
Prepared by: Office of Institutional Research, 10/1/76.